



(51) International Patent Classification:

A61C 17/02 (2006.01) A61C 17/34 (2006.01)
A61C 17/22 (2006.01)

(21) International Application Number:

PCT/US2016/036628

(22) International Filing Date:

9 June 2016 (09.06.2016)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

2015-119561	12 June 2015 (12.06.2015)	JP
2015-119562	12 June 2015 (12.06.2015)	JP
2015-122897	18 June 2015 (18.06.2015)	JP

(71) Applicants: COLGATE-PALMOLIVE COMPANY
[US/US]; 300 Park Avenue, New York, New York 10022
(US). OMRON HEALTHCARE CO., LTD [JP/JP]; 53,
Kunotsubo, Terado-cho, Muko-shi, Kyoto 617-0002 (JP).

(72) Inventors: YOSHIDA, Hideaki; Omron Healthcare Co.,
Ltd., 53, Kunotsubo, Terado-cho, Muko-shi, Kyoto 617-
0002 (JP). KITAMURA, Masashi; Omron Healthcare
Co., Ltd., 53, Kunotsubo, Terado-cho, Muko-shi, Kyoto
617-0002 (JP). KATANO, Mamoru; Omron Healthcare
Co., Ltd., 53, Kunotsubo, Terado-cho, Muko-shi, Kyoto
617-0002 (JP). MORIKAWA, Sakae; Omron Healthcare
Co., Ltd., 53, Kunotsubo, Terado-cho, Muko-shi, Kyoto
617-0002 (JP).

(74) Agents: BELLES, Brian L. et al.; COLGATE-PAL-
MOLIVE COMPANY, 909 River Road, Piscataway, New
Jersey 08855 (US).

(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY,
BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM,
DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,
HN, HR, HU, ID, IL, IN, IR, IS, KE, KG, KN, KP, KR,
KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG,
MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM,
PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC,
SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN,
TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ,
TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU,
TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE,
DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU,
LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK,
SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
GW, KM, ML, MR, NE, SN, TD, TG).

Published:

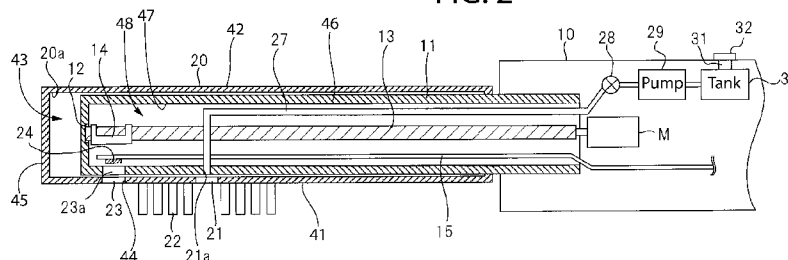
- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments (Rule 48.2(h))

(88) Date of publication of the international search report:

16 March 2017

(54) Title: ELECTRIC TOOTHBRUSH AND METHOD FOR OPERATING AN ELECTRIC TOOTHBRUSH

FIG. 2



(57) Abstract: An electric toothbrush that detects plaque on the teeth, ensures accurate plaque detection, and performs cleaning of plaque. The electric toothbrush may include a body having a gripping part and a stem with a brush unit detachably coupled to the body. The electric toothbrush includes a light emitting element (24) for emitting light onto the tooth and a light receiving element (25) for receiving light that reflects off of the tooth. A controller is included to determine an amount of plaque on the tooth based on the amount of reflected light detected. The electric toothbrush also includes a fluid dispensing system (28, 29, 30) that dispenses fluid based on the amount of reflected light detected. In some aspects, the electric toothbrush may operate in multiple oscillation modes, and it may only dispense fluid in some of the modes but not all of the modes.

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2016/036628

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61C17/02 A61C17/22 A61C17/34
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A61C A61B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2012/266396 A1 (LEUNG ANTHONY KIT LUN [CN]) 25 October 2012 (2012-10-25) abstract	1-6,8-16
A	WO 2015/056197 A1 (KONINKL PHILIPS NV [NL]) 23 April 2015 (2015-04-23) page 2, line 8 - line 18 page 5, line 6 - line 31 page 9, line 1 - line 31	1-6,8-16
X	US 2008/060148 A1 (PINYAYEV ALEKSEY M [US] ET AL) 13 March 2008 (2008-03-13)	1,8
Y	paragraphs [0003] - [0005], [0034], [0040], [0051], [0053], [0054], [0046], [0066], [0067], [0119], [0128] - [0132]	9
	----- -/-	



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

19 January 2017

Date of mailing of the international search report

31/01/2017

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Schmidt, Karsten

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2016/036628

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.: 7, 22-26, 34, 52
because they relate to subject matter not required to be searched by this Authority, namely:
see FURTHER INFORMATION sheet PCT/ISA/210
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. ☒ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
1-6, 8-16, 27-33, 35-51, 53-66
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☒ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2016/036628

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2003/156788 A1 (HENNING THOMAS [DE]) 21 August 2003 (2003-08-21) paragraphs [0030], [0031], [0034]; claim 60 -----	9
A	US 5 301 381 A (KLUPPT MICHAEL F [US]) 12 April 1994 (1994-04-12) column 6, line 30 - line 35 column 7, line 67 - column 8, line 17; figure 4 -----	27-33, 35-51, 53-66
A	US 2012/064480 A1 (HEGEMANN KENNETH J [US]) 15 March 2012 (2012-03-15) paragraph [0134] -----	27-33, 35-51, 53-66

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2016/036628

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2012266396 A1	25-10-2012	CA 2774835 A1 US 2012266396 A1	19-10-2012 25-10-2012
WO 2015056197 A1	23-04-2015	CN 105636479 A EP 3057467 A1 JP 2016538903 A US 2016242652 A1 WO 2015056197 A1	01-06-2016 24-08-2016 15-12-2016 25-08-2016 23-04-2015
US 2008060148 A1	13-03-2008	AU 2005329104 A1 CA 2600855 A1 CN 101193605 A EP 1855612 A1 JP 2008532619 A US 2008060148 A1 WO 2006098719 A1	21-09-2006 21-09-2006 04-06-2008 21-11-2007 21-08-2008 13-03-2008 21-09-2006
US 2003156788 A1	21-08-2003	DE 10133451 A1 EP 1330179 A2 JP 2004521714 A US 2003156788 A1 WO 03005892 A2	30-01-2003 30-07-2003 22-07-2004 21-08-2003 23-01-2003
US 5301381 A	12-04-1994	US 5301381 A US 5321866 A	12-04-1994 21-06-1994
US 2012064480 A1	15-03-2012	NONE	

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-6, 8-16

An electric toothbrush comprising a drive unit, a brush unit and a fluid spray unit, the toothbrush further comprising a light emitting unit and a light detecting unit, capable of detecting stain on a tooth, and the fluid spray is controlled on the basis of the amount of detected light, wherein the light emitting unit emits blue light and the light detecting unit detects red and green light.

2. claims: 17-21

An electric toothbrush comprising a drive unit, a brush unit and a fluid spray unit, the toothbrush further comprising a light emitting unit and a light detecting unit, capable of detecting stain on a tooth, and the fluid spray is controlled on the basis of the amount of detected light, wherein the toothbrush includes a stem having an internal cavity with first and second windows through which windows the emitted and detected light may pass.

3. claims: 27-33, 35-51, 53-66

An electric toothbrush comprising a drive unit, a brush unit and a fluid spray unit, wherein the drive unit performs a first driving mode in a first direction and a second driving mode in a second direction and wherein the fluid spray unit is active in either the first or the second driving mode.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.1

Claims Nos.: 7, 22-26, 34, 52

Claims 7, 22-26, 34, 52 relate to methods of operating an electric toothbrush, i.e., methods of cleaning teeth. Such methods have a prophylactic and/or therapeutic effect on the subject to which they are applied and are thus regarded by this International Search Authority as methods for treatment of the human or animal body by therapy (Rule 39.1(iv) PCT, see decision of the Boards of Appeals T 290/86). In accordance with Article 17(2)(b) PCT, claims 7, 22-26, 34, 52 are thus excluded from search.